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CLAIMS

1.　An assist transportation method for reducing a load applied to a work when the worker operates transportation means to transport a product, characterized by floating the product from the transportation means when the product contacts with an obstacle to moderate the impact, detecting the displacement value of the product due to floating, computing the displacement value to compute the reaction force due to the impact, and communicating the reaction force to the worker who operates the transportation means.

2.　An assist transportation device for reducing a load applied to a worker when the worker operates transportation means to transport a product, comprising holding means for holding the product, a floating mechanism set to the connection portion between the holding means and the transportation means, displacement detection means for detecting the displacement value of the floating mechanism, and control means for computing the displacement vale detected by the displacement detection means and computing a reaction force, characterized by communicating the reaction force to the worker who operates the transportation means.

3.　An assist transportation method for reducing a load applied to a worker when the worker operates transportation means to transport a product, characterized by setting a work area in which the product can freely move and setting a limit

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area formed adjacently to the work area to generate a predetermined reaction force so as to return the product to the work area when the product comes in.

4. An assist transportation device for reducing a load applied to a worker when the worker operates transportation means to transport a product, comprising a work area in which the product can freely move, and a limit area formed adjacently to the work area to generate a predetermined reaction force so as to return the product to the work area when the product comes in, and control means for computing the entering value of the product entering the limit area and the reaction force.

5. An assist transportation method for reducing a load applied to a worker when the worker operates transportation means to transport a product, characterized by floating the product from the transportation means, detecting the displacement value of the product due to the floating when the worker holds the product and operates the product in a direction for transporting the product, and computing the displacement value to assist-transport the product as the target value of the transportation means.

6. An assist transportation device for reducing a load applied to a worker when the worker operates transportation means and transport a product, comprising holding means for holding the product, an operation handle set to the holding

means for the worker to lead the product in a desired direction, a floating mechanism set to the connection portion between the holding means and the transportation means, displacement detection means for detecting the displacement value of the floating mechanism, and control means for computing the displacement value detected by the displacement detection means and assist-transporting the product as the target value of the transportation means.

7. An assist transportation method for reducing a load applied to a worker for operating an operation handle set to transportation means and transporting a product, characterized by detecting the direction and magnitude of an operation force applied to the operation handle when the worker operates the product in a direction for transporting the product, detecting the direction and magnitude of an external force when the product contacts with an obstacle, computing the direction and magnitude of the external force, assist-transporting the product as the target value of the transportation means, and communicating a reaction force due to the external force to the worker.

8. An assist transportation device for reducing a load applied to a worker for operating an operation handle set to transportation means and transporting a product, comprising holding means for holding the product, operation force detection means for detecting the direction and magnitude of

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an operation force applied to the operation handle set to the connection portion between the holding means and the transportation means, external force detection means set to the connection portion between the holding means and the transportation means to detect the direction and magnitude of an external force applied to the holding means, and control means for computing the direction and magnitude of the operation force detected by the operation force detection means and the direction and magnitude of the external force detected by the external force detection means and assist-transporting the product as the target value of the transportation means, characterized by communicating a reaction force due to the external force to the worker.

9.　An assist transportation method for reducing a load applied to a worker for operating transportation means and transporting a product, characterized by detecting the direction and magnitude of an operation force when the worker grips the product and moves the transportation means in a direction for transporting the product, computing the direction and magnitude of the operation force, and assist-transporting the product as the target value of the transportation means.

10.　An assist transportation device for reducing a load applied to a worker for operating transportation means and transporting a product, comprising holding means for holding

the product, an operation handle set to the holding means for the worker to lead the product in a desired direction, external force detection means set to the connection portion between the holding means and the transportation means to detect the direction and magnitude of an external force applied to the holding means, and control means for computing the direction and magnitude of the external force detected by the external force detection means and assist-transporting the product as the target value of the transportation means.

11. An assist transportation method for reducing a load applied to a worker when the worker operates transportation means to transport a product, comprising a condition setting step of setting a transportation area and an assist condition every predetermined position of a transportation route and a transportation area setting step of setting a transportation area and assist condition between predetermined positions adjacent to each other in accordance with a transportation area and assist condition every predetermined position set in the condition setting step, characterized by setting the transportation area of a component.

12. An assist transportation method for reducing a load applied to a worker when the worker operates transportation means to transport a product, comprising a transportation area recognizing step of recognizing a transportation route and a transportation area in accordance with the position data

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for a plurality of teaching points and transportation area data set for each teaching point and a transportation portion position moving step of obtaining a transportation route closest to the position of a transportation portion when the position of the transportation portion is out of a transportation area and moving the transportation portion into a predetermined position of the obtained transportation route or the transportation area of the obtained transportation route, characterized by returning the transportation portion into the transportation area when the position of the transportation portion for supporting the product is deviated from the transportation area.